Studies of Pacific Island Plants, XX
Notes on Some Fijian Species of *Readea* and *Psychotria* (Rubiaceae)[1]

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IN RECENT YEARS collections made by staff members of the Fiji Department of Agriculture have substantially added to the available study material of Fijian plants, permitting more adequate knowledge of many species and the recognition of others as new to science. Study of the Rubiaceae of these collections has made desirable the publication of notes to clarify certain complexes within the genus *Psychotria.* During the course of this work the related genus *Readea* was also reviewed. In the present paper four species of *Psychotria* are described as new, and hitherto unpublished combinations are proposed for three others.

The pertinent herbarium material of several institutions has been examined and some of it cited, with these indicated abbreviations: Arnold Arboretum of Harvard University (A); Bernice P. Bishop Museum (BISH); British Museum (BM); Gray Herbarium of Harvard University (GH); Royal Botanic Gardens, Kew (K); New York Botanical Garden (NY); Department of Agriculture, Suva, Fiji (SUVA); University of California, Berkeley (UC); and U. S. National Herbarium (US). The cooperation of administrators of these herbaria is appreciated.

Readea GILLESPIE

In proposing the genus *Readea* in 1930, Gillespie based it on a new Fijian endemic, *R. membranacea.* The genus appears quite distinct from *Psychotria* and other allies, differing in having its large calyx-limb completely enclosing the corolla until the bud is very large, and then splitting into four lobes that are alternately slightly unequal in width; these lobes resemble the corolla-lobes in size and texture and are strictly alternate with them, as is well shown in Gillespie's illustration. The disk is comparatively elongate, fused at base with the style but distally free and urceolate. The fruit is also remarkably large, truncate and depressed at apex, and with bluntly carinate pyrenes. Because Gillespie's description is not entirely accurate in some details, and in view of the abundant material now available, it seems advisable to record new generic and specific descriptions. This is pertinent in connection with a review of the two new species of *Readea* proposed by Fosberg (in Sargentia 1:136–137. 1942), species known to him only in fruiting condition but, on consideration of more abundant material, certainly not to be left in *Readea,* which remains a highly distinctive monotypic genus. The two later species, in neither size of fruit nor type of pyrene, can be excluded from *Psychotria.* Both specific epithets are available in *Psychotria,* and below I propose the appropriate new combinations and note the apparent relationships.

Readea Gillespie in Bishop Mus. Bull. 74:35. 1930.

Trees or shrubs, the stipules intrapetiolar, connate into a short sheath, the leaves opposite, petiolate; inflorescence terminal, cymose, the bracts small, the pedicels broadened into the hypanthium, this contracted apically, the calyx-limb, corolla, and stamens readily caducous, the ovary-locules 2, the ovules solitary, obovoid, ascending from base; disk conical-cylindric, free and urceolate distally, often persistent; calyx-limb completely enclosing the corolla in bud, eventually splitting from apex into 4 lobes, these alternately slightly unequal in width, similar to corolla-lobes in size and texture and alternate with them; corolla eventually deeply 4-lobed, the lobes spreading; stamens 4, attached at apex of

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corolla-tube, the anthers dorsifixed; style shorter than corolla, distally bifid; fruit large, carnose and smooth when fresh, often obviously 8-costate when dried, truncate or shallowly depressed at the broad apex, and there marginally marked by the conspicuous calycine scar, the pyrenes dorsally tricarinate, the carinas rounded.

Readea membranacea Gillespie in Bishop Mus. Bull. 74:35, fig. 49. 1930.

Slender tree or shrub 2–7 m high, the young parts glabrous and often marked with copious embedded cystoliths, the branchlets slender, subterete or distally flattened; stipules submembranous, 1.5–4 mm long, at length separating distally, the lobes broadly suborbicular and sometimes apically callose-apiculate; petioles slender, subterete, 1–6 cm long; leaf-blades submembranous, elliptic to lanceolate, (10–) 12–23 cm long, (3–) 4–13.5 cm broad, acute to attenuate at base and long-decurrent on petiole, gradually acuminate and often callose-tipped at apex, on both sides ornamented with embedded short linear cystoliths, the costa prominent on both sides, the secondary nerves 8–15 per side, curved-spreading, ascending and irregularly anastomosing toward margin, prominulous above, prominent beneath, the veinlet-reticulation lax, subimmersed or prominulous on both sides; inflorescence solitary and terminal at ends of branchlets, lax, 2 or 3 times dichotomously or trichotomously branched, at anthesis to 10 cm long and broad, the branches, pedicels, and hypanthium minutely but sometimes copiously puberulent with 1- or 2-celled hairs (less than 0.1 mm long) and often soon glabrate, the bracts submembranous, oblong-deltoid, 2–3 mm long, acute, the flower-subtending bracteoles similar or suborbicular, 1–1.5 mm long, the flowers borne in ultimate dichotomies or at ends of ultimate branchlets; pedicels at anthesis 1–5 mm long, the hypanthium carnose, pyriform, at anthesis 2.5–3 mm long, 2.5–3 mm broad distally and there abruptly contracted; disk carnose, conical-cylindric, 1.5–2 mm long, fused to the stylar base but free and urceolate distally, minutely 4-lobed at margin; style filiform, 4–7 mm long, bifid in the distal 1–2 mm and stigmatiferous; calyx-limb glabrous, in advanced bud broadly ellipsoid, obtuse, up to 13 × 6 mm, carnose, with copious embedded cystoliths (these also apparent in pedicels, hypanthium, and corolla), the mature calyx-limb campanulate, up to 16 mm long and 20 mm across the spreading lobes, the basal portion 5–6 mm long, cylindric-obconical, the lobes valvate, eventually spreading or reflexed, becoming submembranous, 9–10 mm long, callose-obtuse, alternately slightly unequal, the broader ones elliptic-oblong, 3.5–4 mm broad, the narrower ones lanceolate-oblong, 2.5–3 mm broad; corolla similar to calyx-limb in texture, ovoid in bud and up to 12 mm long, eventually as long as calyx-limb and up to 12 mm across the spreading lobes, the tube at maturity 6–7 mm long, the lobes subequal, oblong-lanceolate, 9–10 mm long, 1.5–2 mm broad, acute; stamens with membranous filiform-ligulate filaments 1.5–2 mm long, the anthers narrowly oblong, dorsifixed near middle, 4.5–5 mm long, obtuse or cordate at base, minutely apiculate at apex; fructescence sometimes up to 15 cm long, the fruiting pedicels stout, 5–10 mm long; fruits obovoid-cylindric, 25–40 mm long, 10–20 mm broad, attenuate to pedicel, often umbonate on the slightly depressed apex with the subpersistent disk and stylar base, the pyrenes semi-obovoid-cylindric, up to 35 × 17 × 8 mm, subacute at base, slightly depressed at apex and there marginally crenulate, dorsally tricarinate or also with lateral subsidiary keels, the carinas rounded but coarsely rugulose, the ventral surface of the pyrene flattened but with an inconspicuous median carina.

DISTRIBUTION: Endemic to Fiji, and thus far known only from the three largest islands, Viti Levu, Vanua Levu, and Taveuni, where it is often locally common in forest at elevations from near sea level to 1100 m. It has usually been noted as a slender tree to 7 m high, with faintly fragrant flowers; the mature corolla is pale green and the anthers bright yellow; at maturity the fruit becomes dark red or purple. Some 33 collections have been examined, indicating that the species is not rare and is probably to be expected from other high islands.

HOLOTYPE: Fiji: Taveuni: vicinity of Waiyevo, on banks of streams in coconut plantations, alt. 200 m, *Gillespie 4622* (BISH), Feb. 20, 1928.

Psychotria L.

Psychotria glabra AND RELATIVES

A group of Fijian species of *Psychotria* that has proved particularly difficult comprises those species with a conspicuous calyx-limb that is either subrotate from its base, or campanulate and gradually broadened from its base, or fusiform proximally and then ultimately broadened into a conspicuously flaring apex at least 7 mm in diameter. In fruit, these species have the calyx-limb often early caducous and leaving an obvious, broad scar. Their stipules are laterally connate in the lower portion and deeply bifid distally.

On the one hand, such species are readily separable from the species-group of *P. confertiloba* A. C. Sm., in which the stipules form a distally narrowed calyptriform sheath, the calyx-limb is long persistent but eventually caducous and leaving an inconspicuous scar, the corolla is often longer, and the fruit is large and sharply 4-angled when dried. On the other hand, the species related to *P. glabra* (Turrill) Fosberg differ from the species-group of *P. turbinata* A. Gray in their flaring, rather than cylindric to fusiform or narrowly campanulate, calyx-limb. The immediate relatives of *P. glabra* have the calyx glabrous, but another closely allied group, including *P. pubiflora* (A. Gray) Fosberg, has the calyx, or at least the hypanthium, pilose or obviously puberulent.

One of the complicating factors in the group of *P. glabra* has been the identification of many Fijian specimens as *P. milnei* (A. Gray) K. Schum., typified by a New Hebridean plant. It is now evident that *P. milnei* does not extend to Fiji, and in fact has no close relatives there; it is characterized by the type of calyx noted for the *P. glabra* group, but its stipules are entirely different. To clarify this situation, it seems well to re-state the basic nomenclatural references pertaining to *P. milnei*.

Psychotria milnei (A. Gray) K. Schum. in E. and P. Nat. Pfl. IV. 4:113. 1897.

Calycosia milnei A. Gray in Proc. Am. Acad. Arts Sci. 4:307. 1860; Guillaumin in J. Arnold Arb. 13:8. 1932.

Calycosia aneitensis Guillaumin in Bull. Soc. Bot. Fr. 76:303. 1929.

Calycodendron milnei A. C. Sm. in Bishop Mus. Bull. 141:155. 1936.

HOLOTYPE: New Hebrides: Aneityum: *Milne 275* (K holotype, GH fragment).

OTHER COLLECTIONS: New Hebrides: Eromanga: *MacGillivray* (BM); *Kajewski 315* (A, NY); *de la Rüe,* Feb. 19, 1936 (A). Tanna: *Kajewski 162* (A, K, NY). Aneityum: *MacGillivray 6* (BM type of *Calycosia aneitensis*), *54* (BM); *Kajewski 817* (A, BISH, K, NY); *Cheesman A.48* (BISH, BM).

The essential characters of *P. milnei* may be noted as follows: stipules free to base, elliptic, 4–13 mm long, 2–7 mm broad, narrowed at base, rounded and entire at apex; calyx glabrous, the limb cupuliform-campanulate, 5–12 mm long, 7–11 mm in apical diameter; corolla glabrous without, infundibular, 15–20 mm long, the lobes oblong, 3–4 mm long; fruit narrowly ellipsoid, 11–14 mm long, 6–7 mm broad, subterete or inconspicuously 4-angled when dried, narrowed at base, rounded at apex, the apical scar conspicuous but only 1–2 mm in diameter.

Fijian plants with this combination of characters have not been observed, and the Fijian collections mentioned by Seemann and others as representing this species must be referred elsewhere. With the definite removal of *P. milnei,* the described Fijian species related to *P. glabra* are *P. jugalis* A. C. Sm., *P. fragrans* (Gillespie) Fosberg, and *P. leucocalyx* A. C. Sm. *Readea prismoclavata* Fosberg is also to be placed in this alliance. The following notes are intended to clarify some of these species and to add a novelty.

Psychotria glabra (Turrill) Fosberg in Sargentia 1:126. 1942; J. W. Parham, Pl. Fiji Isl. 204. 1964.

Calycosia milnei sensu Seem. Fl. Vit. 133, excl. typum. 1866; non A. Gray.

Calycosia glabra Turrill in J. Linn. Soc. Bot. 43:26. 1915.

Calycodendron glabrum A. C. Sm. in Bishop Mus. Bull. 141:155. 1936.

Psychotria milnei sensu J. W. Parham, Pl. Fiji Isl. 206, excl. syn. 1964.

It seems advisable to amplify Turrill's original description, on the basis of the material now available, as follows:

Stipules (apparently only basal fragments were seen and described by Turrill) variable in size, 7–25 mm long, connate in the basal 2–5 mm, the free portions deeply bifid into lanceolate lobes; inflorescence ample, 6–15 mm long, 2- or 3-times branched, pedunculate, the peduncle 1.5–6 cm long, the pedicels in flower and fruit 5–10 mm long, or occasionally shorter in flower; calyx-limb 10–25 mm long, the basal portion cylindric or narrowly campanulate, 3–8 mm long, 2–4 mm in diameter, the flaring portion 10–25 mm in apical diameter, often conspicuously glandular, the lobes 5, broadly ovate-deltoid, 3–6 mm long, 4–15 mm broad, rounded or broadly obtuse; corolla glabrous without, 25–35 mm long, the tube about 2 mm in diameter, the lobes 5, oblong, 5–6 mm long, 2–2.5 mm broad; fruit conspicuously turbinate, 7–8 mm long, 6–7.5 mm broad, smooth when fresh, irregularly rugulose when dried, attenuate at base, truncate at apex and with a conspicuous calycine scar, the pericarp carnose; pyrenes semi-obovoid but slightly contracted just above middle, about 7 × 5 × 3 mm, acute at base, rounded-truncate at apex, slightly flattened toward margins, smooth ventrally, rounded dorsally or with a single, very blunt, broad carina toward base, and with three rounded protuberances distally.

DISTRIBUTION: Endemic to Fiji, and thus far known from the islands of Viti Levu, Kandavu, and Ovalau, where it occurs in forest at elevations of 100–850 m. Specimens have been taken from usually slender, small trees 2–5 m high; the calyx and corolla are white, and the former is often conspicuously reddish-glandular.

HOLOTYPE: Fiji: Kandavu: slopes of Mt. Mbuke Levu, *im Thurn F.10* (K holotype), March 5, 1905.

OTHER COLLECTIONS: Fiji: Viti Levu: Serua: slopes of Mt. Tikituru, *Fiji Dept. Agr. 14473* (BISH, SUVA); Namoli Creek, Nambukelevu, *Fiji Dept. Agr. 14486* (BISH, SUVA); Vunimbua Creek, Nambukelevu, *Fiji Dept. Agr. 14866* (BISH, SUVA); inland from Ngaloa, *Fiji Dept. Agr. 14095* (BISH, SUVA). Naitasiri: Sawani-Serea Road, *Fiji Dept. Agr. 11192* (BISH, SUVA), *11199* (BISH, SUVA). Rewa: Mt. Korombamba, *Gillespie 2218* (BISH). Ovalau: hills southeast of Mbureta River, *Smith 7456* (BISH, US); without further locality, *Seemann 213* (GH, K).

As thus circumscribed, *P. glabra* is a well marked species, differing from *P. jugalis, P. fragrans,* and *P. leucocalyx* in having the ascending basal portion of its conspicuous calyx-limb comparatively prominent, 3–8 mm long rather than less than 2 mm long; in the other named species the limb flares nearly from the base to form a subrotate, rather than broadly campanulate, appendage. The only Fijian *Psychotria* that closely resembles *P. glabra* in the form of its glabrous calyx is the following.

Psychotria prismoclavata (Fosberg) comb. nov.

Readea prismoclavata Fosberg in Sargentia 1: 137. 1942; J. W. Parham, Pl. Fiji Isl. 209. 1964.

On the basis of the essentially mature fruits on the single specimen available to him, Fosberg referred this distinctive species to the genus *Readea.* Other specimens are now at hand, however, in which the fruits are still surmounted by the calyx-limb, from which the position of the taxon in *Psychotria* is apparent. Corollas are still unknown. Additional notes based on the available material follow.

Stipules 5–7.5 mm long, connate in the basal 1–2 mm, free distally and deeply bifid, the lobes lanceolate, 2.5–5 mm long, 1–2 mm broad; inflorescence (known only in fruit) apparently 1- or 3-flowered, the peduncle, if present, 1–1.5 cm long, the pedicels in fruit 10–30 mm long, sometimes jointed, the fruits, if solitary, sometimes appearing axillary due to continuing vegetative development of the branchlet; calyx-limb occasionally subpersistent in fruit, about 10 mm long, the basal portion narrowly campanulate, 3–4 mm long and 4–5 mm in diameter, the flaring portion 9–10 mm in apical diameter, the lobes 5, oblong, 3.5–5 mm long, 2.5–4 mm broad, obtuse or subacute; fruit ellipsoid when fresh, clavate-prismatic or quadrangular-pyriform when dried, (8–) 11–20 mm long, (5–)

7–10 mm broad, attenuate at base, truncate at apex and with a conspicuous calycine scar, the pericarp carnose; pyrenes semiobovoid but sharply angled, (7–) 8–14 mm long, (4.5–) 5–7 mm broad, acute at base, conspicuously tridentate at apex, flattened at lateral margins, smooth ventrally, conspicuously unicarinate dorsally with a thin, bladelike keel, bifoveolate dorsally or marginally toward apex.

DISTRIBUTION: Endemic to Fiji and apparently rare, known only from Viti Levu and Vanua Levu at elevations of 800–1120 m, occurring in the dense forest and thickets of exposed crests and ridges. Collections are noted as shrubs 2–3 m high, fruiting between July and November; fruits have been indicated as pale green, white, or red, the last perhaps indicating the more mature condition.

HOLOTYPE: Fiji: Viti Levu: Namosi: Mt. Vakarongasiu, alt. 800 m, *Gillespie 3272* (GH holotype; isotypes at A, BISH), Oct. 2, 1927.

OTHER COLLECTIONS: Fiji: Viti Levu: Mba: ridge between Mt. Nanggaranambuluta and Mt. Namama, east of Nandarivatu, *Smith 4984* (A), *5684* (A, US). Vanua Levu: Thakaundrove: summit of Mt. Mbatini, *Smith 704* (BISH, GH, K, NY).

The mature fruit of this species is not of a type common among Fijian Psychotriae, being sharply 4-angled and with a single bladelike dorsal carina on its pyrenes; however, the genus includes a great diversity of fruit types. The calyx-limb of *P. prismoclavata* indicates a general relationship of the species with *P. glabra* (Turrill) Fosberg, from which it obviously differs in its simpler inflorescence, long pedicels, large and differently shaped fruits, and sharply carinate pyrenes.

Psychotria koroiveibaui sp. nov.

Arbor ad 6 m alta praeter corollam ubique glabra, ramulis in internodiis distalibus complanatis ibi 5–8 mm latis, partibus novellis cystolithis linearibus ornatis; stipules 9–10 (ad 20?) mm longis, inferne in vaginam brevem 1–2 mm longam connatis, partibus liberis in segmentos lanceolato-deltoideos acutos ad 4 × 3 mm bifidis, cicatricibus conspicuis; petiolis subteretibus 2–3 cm longis, foliorum laminis papyraceis in sicco fusco-viridibus oblongo-ellipticis, 15–25 cm longis, 6–10.5 cm latis, basi subacutis et in petiolum decurrentibus, apice obtusis vel obtuse brevi-acuminatis, margine integris et anguste revolutis, costa utrinque prominente, nervis secundariis utrinsecus 12–16 patentibus marginem versus curvatis et anastomosantibus utrinque elevatis, rete venularum supra subplano subtus prominulo; inflorescentia terminali (vel demum axillari) laxa multiflora 12–20 cm diametro epedunculata e basi 3-partita 3–5-plo divisa, ramulis gracilibus principalibus ad 6 cm longis, bracteis bracteolisque minutis semiorbicularibus 0.5–1 mm latis fimbriatis evanescentibus; pedicellis gracilibus sub anthesi et fructu 4–10 mm longis; calyce 8–11 mm longo, hypanthio obconico 2–2.5 mm longo et diametro basi in pedicellum attenuato, limbo submembranaceo breviter adscendente (parte basali anguste campanulata 2–2.5 mm longa et 2–3 mm diametro) deinde patente apice 8–11 mm diametro, lobis 5 oblongo-ovatis 2.5–4 mm longis latisque eglandulosis manifeste nervatis apice rotundatis vel obtusis; corolla subcarnosa infundibulari sub anthesi 15–25 mm longa, tubo inferne 1–1.5 mm superne ad 4 mm diametro extus glabro vel interdum pilis ad 0.1 mm longis inconspicue hispidulo-puberulo intus basi excepta pilis pallidis 0.5–1 mm longis copiose tomentello, lobis 5 oblongis 3–3.5 × 2–2.5 mm superne crassocarnosis ibi manifeste hispidulo-puberulis apice obtusis conspicue cucullatis; staminibus 5 faucibus affixis, antheris sessilibus oblongis 1.5–2.5 mm longis; disco annulari-pulvinato 0.5–0.8 mm alto; stylo filiformi corollam subaequante apice bifido; fructibus turbinatis 8–9 mm longis 7–8 mm latis in sicco paullo rugulosis, basi acutis, apice truncato-depressis et calycis cicatrice signatis, pyrenis semiobovoideis supra medium paullo contractis 7–8 × 6–6.5 × 3–4 mm, basi obtusis, apice rotundato-truncatis, marginem versus complanatis, ventre levibus, dorso inferne obscure unicarinatis superne tuberculis 3–5 irregularibus conspicue ornatis.

DISTRIBUTION: Endemic to Fiji and known from only two collections, from Viti Levu and Vanua Levu, occurring in forest or crest thickets

at elevations of about 200–700 m. The available specimens are from trees 5–6 m high, with white calyces and corollas.

HOLOTYPE: Fiji: Viti Levu: Serua: Vunimaravu forest in upper Navua River region, alt. about 200 m, *Fiji Dept. Agr.* (coll. D. Koroiveibau and I. Qoro) *14880* (BISH holotype; isotype at SUVA), April 21, 1966.

OTHER MATERIAL: Fiji: Vanua Levu: Thakaundrove: eastern buttress of Mt. Ndikeva, *Smith 1891* (BISH, NY).

The new species here described seems very distinct, its closest relationship apparently being with *P. fragrans* (Gillespie) Fosberg and related species. From these it clearly differs in having its inflorescences large, forming a lax cluster 12–20 cm in diameter, and epedunculate, rather than pedunculate, more compact, and fewer-flowered. The bracts and bracteoles of the new species are minute and scalelike, and the calyx-limb is submembranous, eglandular, and obviously nerved. In calycine characters the new species also suggests the species-group including *P. carnea* (Forst. f.) A. C. Sm., *P. hunteri* (Horne ex Baker) A. C. Sm., and a few others; but those species have the corolla-limb sharply enlarged and 4-angled or 4-winged just prior to anthesis, the lobes obviously veined, broad, and appressed at their inner margins to form the angles or wings; furthermore, their calyx-limbs are persistent in fruit. Although *P. carnea* and its immediate relatives appear to form quite a different species-group, *P. koroiveibaui* suggests a relationship between that group and the species allied to *P. fragrans.*

The two cited specimens are so similar in all basic characters that their conspecificity seems certain. However, whereas the corolla of the type is 15–16 mm long and glabrous except on the lobes, that of the Vanua Levu specimen is 20–25 mm long and also hispidulous-puberulent on the tube. This degree of variability seems not unusual in *Psychotria,* where characters of the calyx, pyrenes, and stipule type are apparently more stable. The above fruit description is taken from *Smith 1891,* which I erroneously referred in 1936 (in Bishop Mus. Bull. 141:155) to *Calycodendron milnei;* it represents neither that New Hebridean species nor the Fijian *P. glabra,* discussed above.

It is a pleasure to name this species for one of the collectors, Dominiko Koroiveibau, in recognition of the scope and value of his extensive collections of recent years for the Fiji Department of Agriculture.

Psychotria pubiflora AND RELATIVES

The species-group of Fijian Psychotriae centering around *P. pubiflora* (A. Gray) Fosberg, as mentioned above, is separable from *P. glabra* and its close allies in having the calyx (at least the hypanthium) and often other parts of the inflorescence pilose or obviously puberulent. The two groups show interrelationships through pairs of species and are certainly not natural, but for convenience they may be recognized. In addition to *P. pubiflora,* the present group consists of *P. rufocalyx* Fosberg, *P. brevicalyx* Fosberg, *P. nandarivatensis* A. C. Sm., *P. crassiflora* Fosberg, *P. magnifica* (Gillespie) Fosberg, *P. gibbsiae* S. Moore, *P. timonioides* Fosberg, and *P. neurocalyx* Gillespie. *Psychotria pubiflora* has been accorded too extensive a distribution; the following notes attempt to clarify this situation, and a new species allied to *P. magnifica* is also described.

Psychotria pubiflora (A. Gray) Fosberg in Sargentia 1:126. 1942; J. W. Parham, Pl. Fiji Isl. 207. 1964.

Calycosia pubiflora A. Gray in Proc. Am. Acad. Arts Sci. 4:306. 1860; Seem. Fl. Vit. 133. 1866; Turrill in J. Linn. Soc. Bot. 43: 26. 1915.

Calycodendron pubiflorum A. C. Sm. in Bishop Mus. Bull. 141:155. 1936.

Specimens mentioned in the listed references are now referred to various species; they infer an unreasonable morphological latitude to *P. pubiflora.* As restricted to the material cited below, *P. pubiflora* is characterized by its obviously pedunculate inflorescence and by a calyx-limb 6–10 mm long, cylindric or fusiform in the basal 3–5 mm, and flaring to an apical diameter of 7–14 mm.

DISTRIBUTION: Endemic to Fiji, and thus far

known with certainty only from southeastern Viti Levu, occurring in primary or secondary forest at elevations of about 150–300 m. Notes indicate the species as a tree or shrub 2–7 m high, with white calyces and corollas.

HOLOTYPE: Fiji: Viti Levu: Namosi: vicinity of Namosi, *Milne 73* (K holotype; GH isotype fragment).

OTHER COLLECTIONS: Fiji: Viti Levu: Naitasiri: Central Road, *MacDaniels 1133* (BISH); Tholo-i-suva, *Fiji Dept. Agr. 11972* (BISH, SUVA), *14517* (BISH, SUVA); Savura, *Fiji Dept. Agr. 12429* (SUVA), *12549* (BISH, SUVA); Tamavua, *Gillespie 2086* (BISH). Rewa: vicinity of Suva, *Meebold 8119* (BISH).

The closest relative of *P. pubiflora* appears to be *P. crassiflora* Fosberg, originally based on a single collection with abnormal flowers but now known through other collections.

Psychotria crassiflora Fosberg in Sargentia 1:132. 1942; J. W. Parham, Pl. Fiji Isl. 202. 1964.

Calycodendron sp. A. C. Sm. in Bishop Mus. Bull. 141:157. 1936.

The type material lacks complete calyx-limbs, the calyces described by Fosberg being half-developed hypanthia surmounted by a broad calycine scar typical of species of this relationship; the species is not a close ally of *P. turbinata* A. Gray, mentioned in the original comparison. The corollas are tissue-filled and evidently deformed. Material from the vicinity of the type locality indicates that a taxon closely allied to *P. pubiflora* (A. Gray) Fosberg is represented. From its ally, *P. crassiflora* differs in its epedunculate inflorescence being 2–4-branched from the base, its larger calyx-limb with the cylindric basal portion 5–10 mm long, and its prevailingly elliptic to obovate leaf-blades that are substantially larger, 15–25 × 6–10.5 cm, those of *P. pubiflora* being elliptic-lanceolate and 8–15 × 3–5 cm.

DISTRIBUTION: Endemic to Fiji, and now known from southern Viti Levu and Kandavu, where it is found in forest, often of a dry type, from near sea level to 400 m. Specimens are from trees or shrubs 2–5 m high, with white calyces and corollas.

HOLOTYPE: Fiji: Viti Levu: Serua: Vatutavathe: vicinity of Ngaloa, *Degener 15178* (US holotype; isotypes at A, BISH), May 5, 1941.

OTHER COLLECTIONS: Fiji: Viti Levu: Serua: hills north of Ngaloa, in drainage of Waininggere Creek, *Smith 9204* (BISH, US); between Waininggere and Waisese creeks, between Ngaloa and Wainiyambia, *Smith 9519* (BISH, US); coastal hills in vicinity of Taunovo Creek, east of Wainiyambia, *Smith 9571* (BISH, US). Kandavu: hills above Namalata and Ngaloa bays, *Smith 202* (BISH, GH, NY, US).

Mature corollas of *P. crassiflora* are 25–37 mm long, at first copiously puberulent without but eventually glabrate below the middle, with the tube about 1.5 mm in diameter basally and expanded to 3–4 mm proximally; the lobes are oblong, 5–7 × 1.5–2.5 mm, obtuse and cuculate at apex, and copiously puberulent within. The corollas in this group of *Psychotria* are variable in dimensions due to their rapid growth, and furthermore they wither quickly; mature corollas are not yet available for *P. pubiflora,* but it is doubtful that they will provide useful differentiating characters between the two species.

Psychotria argantha sp. nov.

Frutex vel arbor gracilis ad 4 m alta, ramulis gracilibus superne complanatis interdum subteretibus, novellis petiolisque pilis rubro-griseis unicellularibus haud 0.05 mm longis copiose puberulis, indumento inflorescentiae ramulis pedicellis calycibus simili; stipulis 4–6 mm longis 4–8 mm latis in vaginam alte connatis mox subglabratis caducis apice arista unica 0.5–1 mm longa inconspicue ornatis; petiolis gracilibus 1.5–3 cm longis, foliorum laminis papyraceis in sicco viridi-fuscis lanceolatis vel elliptico-lanceolatis, 12–23 cm longis, 3–6.5 cm latis, basi attenuatis et in petiolum longe decurrentibus, apice gradatim angustatis obtusis vel calloso-acutis, supra glabris, subtus costa et nervis ut petiolo copiose puberulis, costa supra paullo elevata subtus prominente, nervis secundariis utrinsecus 9–

14 erecto-patentibus marginem versus curvatis anastomosantibus supra planis subtus prominulis, venulis immersis vel subtus paullo prominulis; inflorescentia terminali multiflora sub anthesi et fructu 3–12 cm longa et 6–14 cm lata epedunculata e basi 3–5-ramosa 2- vel 3-plo divisa, bracteis puberulis irregulariter deltoideo-oblongis 1–2 mm longis margine eroso-fimbriatis, bracteolis similibus minoribus, pedicellis diversis 1–9 mm longis; calyce sub anthesi 6–10 mm longo, hypanthio cupuliformi haud 1 mm longo in pedicellum attenuato, limbo mox glabrato, parte basali fusiformi-cylindrica 1.5–2 mm longa et 2–2.5 mm diametro, parte distali campanulato-subrotata apice 7–10 mm diametro eglandulosa vel obscure rubro-glandulosa inconspicue reticulato-nervosa, lobis 5 deltoideis obtusis 2–4 × 3–6 mm; corolla gracili infundibulari sub anthesi videtur 13–17 mm longa, tubo basi haud 1 mm superne ad 2 mm diametro supra medium et lobis copiose minute hispidulo-puberulo intus medium versus tomentello, lobis 5 oblongis 2–4 × 1.2–1.7 mm apice subacutis cucullatis; antheris subsessilibus oblongis circiter 1.5 mm longis; disco pulvinato glabro 0.8–1 mm alto 1.2–1.5 mm diametro, stylo filiformi apice bifido; fructibus glabratis turbinatis 4.5–5 mm longis 5–6.5 mm latis, basi acutis, apice truncato-rotundatis disco et cicatrice calycina ornatis, in sicco irregulariter rugulosis, pericarpio carnoso, pyrenis semioboviodeis 4–4.5 × 3.5–4 × 2.5–3 mm, basi obtusis, apice truncato-rotundatis, ventre levibus, dorso inferne rotundatis et margine complanatis supra medium in tuberculos 3–5 irregularia conspicue incrassatis.

DISTRIBUTION: Endemic to Fiji and known from only two collections, both from southern Vanua Levu, occurring in forest or in dense crest thickets at elevations of 100–1030 m. The species was noted as a slender tree or shrub 3–4 m high, with white calyces and corollas. The type collection bore flowers and fruits in May; the second collection cited, from the crest near the high point of the island, was in flower in November.

HOLOTYPE: Fiji: Vanua Levu: Mbua: lower Wainunu River valley, between Thongea and Navakasali, alt. 100–200 m, *Smith 1749* (BISH holotype; isotypes at GH, K, NY, US, etc.), May 7, 1934.

OTHER MATERIAL: Fiji: Vanua Levu: Thakaundrove: Mt. Mbatini, crest of range, *Smith* 666 (BISH, GH, K, NY, US, etc.).

The new species, provisionally referred to *P. magnifica* (Gillespie) Fosberg, is now seen to be amply distinct, although that is its closest relative. Both species have puberulent inflorescences and a calyx-limb subrotate from a short, fusiform-cylindric basal portion. *Psychotria argantha* differs from *P. magnifica,* which is thus far known only from central Viti Levu, in having its leaf-blades puberulent beneath on the costa and secondaries instead of glabrous, its inflorescence 3–5-branched from base instead of obviously pedunculate, and its stipules of a different type. The stipules of *P. magnifica* are 5–10 mm long, laterally connate only in the basal 2–4 mm, and free and deeply bifid distally; those of the new species are more highly connate and terminate in a single, very short awn. The corolla of *P. magnifica* is about 30 mm long at anthesis and that of *P. argantha* only 13–17 mm, but this is not a dependable character; in corolla indument the two species are similar.

Psychotria turbinata AND RELATIVES

A group of 11 Fijian species of *Psychotria,* of which the most abundant is *P. turbinata* A. Gray, is well characterized by having the free portion of calyces conspicuous, exceeding the hypanthium in length at anthesis, in shape ellipsoid-cylindric or urceolate or fusiform or narrowly campanulate, but not more than 5 mm in apical diameter. In fruit shape, pyrene ornamentation, and stipule characters the members of this species-group are somewhat diverse, but the reticulate relationships among Fijian Psychotriae are such that use of the calyx-limb as the major character for recognition seems best for grouping related species. This particular group is allied to three other species-groups as follows: *P. glabra* (Turrill) Fosberg and its allies have the calyx-limb subrotate from base or campanulate (in which case the limb is comparatively large, 7 mm or more in apical diameter); *P. pubiflora* (A. Gray) Fosberg and its allies are

similar to the preceding in calycine characters, but the calyx (at least the hypanthium) is notably pubescent; *P. confertiloba* A. C. Sm. and its allies have an enlarged but comparatively narrow calyx-limb, an elongate corolla, and a particularly large, sharply 4-angled fruit, on which the caducous calyx-limb leaves an inconspicuous scar, whereas in the other three species-groups here mentioned the calycine scar of the fruit is broad and obvious.

Within the *P. turbinata* species group, several species require elucidation. Of particular interest are *P. vitiensis* Fosberg and its two immediate relatives, which have the calyx-limb fusiform to elliptic, often slightly contracted toward apex and then narrowly flaring, and with comparatively inconspicuous lobes.

Psychotria vitiensis Fosberg in Sargentia 1:127. 1942.

Psychotria vitiensis Seem. in Bonplandia 9: 257, nomen. 1861, Fl. Vit. 136, as synonym. 1866.

Calycosia monticola Gillespie in Bishop Mus. Bull. 74:39, fig. 55. 1930; not *Psychotria monticola* Hiern (1877).

DISTRIBUTION: Endemic to Fiji, and thus far known only from a very limited area on the summit and slopes of Mt. Voma, in Namosi Province, Viti Levu. In spite of its narrow range the species must be locally frequent, as about 15 collections are now at hand, most of them resulting from the activities of collectors of the Fiji Department of Agriculture. Collections have been made at altitudes of 450–923 m, in slope forests, on forested cliffs, and in the forests of ridges and crests. Plants are noted as trees or shrubs 1–3 m high, with a white corolla and eventually red fruit.

The question of correct typification of this taxon merits discussion. In proposing *P. vitiensis* as a new name, Fosberg correctly indicated that the binomial as used by Seemann was first published as a *nomen nudum* and later as a synonym of *P. calycosa* A. Gray. However, he neglected to indicate whether he wished to designate as the holotype *Seemann 246* (the specimen mentioned by Seemann) or the type of *Calycosia monticola* Gillespie. The former of these specimens has no status that would demand its consideration as the type of Fosberg's concept. Therefore, I herewith designate as lectotype the specimen well described and figured by Gillespie as the type of his *Calycosia monticola.*

HOLOTYPE: Fiji: Viti Levu: Namosi: slopes of Mt. Voma, along trail from Namosi Village, alt. 700 m, *Gillespie 2896* (BISH holotype; isotype at UC), Sept. 11, 1927.

Psychotria stenantha A. C. Sm. in Contr. U. S. Nat. Herb. 37:96. 1967.

DISTRIBUTION: No additional material of this apparently rare species has been noted since its description. The holotype was obtained in thick forest on the Mt. Evans Range of northwestern Viti Levu, Fiji; it was taken from a shrub or small tree 4–5 m high, with white flower buds.

HOLOTYPE: Fiji: Viti Levu: Mba: Mt. Evans Range, alt. about 1050 m, *Greenwood 1062A* (A holotype; BISH isotype), Sept. 24, 1944.

Psychotria roseata (Fosberg) comb. nov.

Psychotria macrocalyx sensu Gillespie in Bishop Mus. Bull. 91:33, p. p. (excl. typum), fig. 37. 1932.

Readea roseata Fosberg in Sargentia 1:136. 1942.

The holotype and several isotypes of *Readea roseata* provide no sound reason for excluding the taxon from *Psychotria.* The calyx-limb is 4.5–8 mm long, tubular, and short lobed, thus entirely unlike the closed and eventually deeply lobed and spreading calyx-limb of *Readea.* An unmistakable additional specimen is *Gillespie 3922,* well figured by Gillespie under the misidentification of *Psychotria macrocalyx.* The fruits and pyrenes are characteristic of *Psychotria.* The original description of *Readea roseata* is quite adequate, but a few additional points may now be clarified.

Stipules 4–6 mm long, shortly connate basally, free distally, crispate-pilose within at least marginally, the lobes oblong-deltoid, 2–3.5 mm long, 1.5–2 mm broad, obtuse or subacute at apex, not bifid; inflorescence epedunculate, few-branched from base, the pedicels 5–15 mm long; hypanthium narrowly ellipsoid-cylindric, the

calyx-limb cylindric-urceolate, 4.5–8 mm long, crispate-pilose without (hairs multicellular, about 0.2 mm long) or soon glabrate, the lobes oblong-deltoid, 1.5–3 mm long, 1–2 mm broad; corolla narrowly cylindric-infundibuliform, 22–28 mm long, glabrous, the lobes deltoid-oblong, about 2.5 mm long, reflexed at anthesis; fruits narrowly ellipsoid-cylindric, smooth or inconspicuously 6–8-costate, 8–13 mm long, 3.5–6 mm broad, the pyrenes narrowly semicylindric, 8–10 × 2.5–3.5 mm, broadest slightly below middle, subacute at base, truncate at apex, dorsally smooth and rounded or inconspicuously 2- or 3-carinate.

DISTRIBUTION: Endemic to Fiji and known only from two collections from Mba Province, in north central Viti Levu. These collections were obtained in forest at 750–1050 m altitude, from trees about 3 m high; the fruit is deep pink.

HOLOTYPE: Fiji: Viti Levu: Mba: Nauwanga, vicinity of Nandarivatu, alt. 750–900 m, *Degener 14818* (US 2334019 and 2334020 holotype, US 1759601 isotype; isotypes also at A, BISH), March 13, 1941. The two sheets of the holotype, originally designated as being in the herbarium of the U. S. National Arboretum, have been transferred to the U. S. National Herbarium, Smithsonian Institution.

OTHER MATERIAL: Fiji: Viti Levu: Mba: slopes of Mt. Nanggaranambuluta (Lomalangi), *Gillespie 3922* (BISH).

The above description of the corolla is adapted from Gillespie's description and illustration (of *P. macrocalyx*); in my opinion the collections utilized by Gillespie in his concept represent diverse species. His Figure 37, however, is based exclusively on *Gillespie 3922*. The flower illustrated (Fig. 37, e) is not now associated with the Bishop Museum sheet, but the form of its calyx clearly indicates that it was a part of that particular collection. The other specimens utilized by Gillespie are now identified as follows: the isotype and *Seemann 243* are correctly placed in *P. macrocalyx,* discussed below; *Parks 20686* (not *20685*) represents *P. nandarivatensis* A. C. Sm.; and *Gillespie 4111* represents *P. gillespieana* A. C. Sm.

Psychotria roseata is closely allied only to *P. vitiensis* Fosberg and *P. stenantha* A. C. Sm., the differences among these three species being indicated by the following key:

Inflorescence pedunculate (peduncle 1.5–5.5 cm long), the flowers with pedicels 2–6 mm long; calyx-limb 4–7 mm long, glabrous, the lobes 0.5–2 × 1–2 mm; fruits pyriform, bluntly 8-costate, 5–6.5 × 4–5 mm, the pyrenes dorsally 3-keeled, the carinas obtuse to rounded, most pronounced distally; stipules 5–7 mm long, free and bifid distally (lobes 2–3 × about 0.5 mm) ..... *P. vitiensis*

Inflorescence epedunculate, branched from base

Stipules 4–6 mm long, free distally, the free portions 2–3.5 mm long, obtuse or subacute, not bifid; pedicels 5–15 mm long; calyx-limb 4.5–8 mm long, crispate-pilose without or soon glabrate, the lobes 1.5–3 mm long, 1–2 mm broad; fruits ellipsoid-cylindric, smooth or inconspicuously 6–8-costate, 8–13 × 3.5–6 mm, the pyrenes dorsally smooth or inconspicuously 2- or 3-carinate ..... *P. roseata*

Stipules 6–12 mm long, free and bifid distally, the lobes 3–5 mm long; pedicels 1–2 mm long; calyx-limb 2–2.5 mm long, glabrous except at the ciliolate apex, the lobes less than 0.5 mm long; fruits not known ..... *P. stenantha*

Psychotria macrocalyx A. Gray in Proc. Am. Acad. Arts Sci. 4:46. 1860; Seem. Fl. Vit. 136. 1866; Gillespie in Bishop Mus. Bull. 91: 33, p. p., excl. fig. 37. 1932; Yuncker in Bishop Mus. Bull. 220:258. 1959.

Psychotria macrocalyx has been a source of some confusion, because of uncertainty as to its morphological limits and its type locality. Although apparently only one U. S. Exploring Expedition collection was involved, Gray originally mentioned the species as from Fiji and also from the island of Tongatapu in Tonga. Of the two type specimens now at hand, that of the U. S. National Museum is labeled "Tongatabu," while that of the Gray Herbarium bears a printed label "Feejee Islands." Seemann in 1866 indicated the type as from Tonga, adding to the citation his own no. *243,* from Vanua Levu. Gillespie's treatment of 1932 states that the type came from Mbua Bay on Vanua Levu (this information perhaps having been available to him from a Gray manuscript); he cited *Seemann*

243 as well as the type. Unfortunately, Gillespie also utilized for his description three other collections belonging to three different species of *Psychotria.* One of these, *Gillespie 3922,* served as the basis of his figure 37 and represents *P. roseata,* as noted above under that species. In his 1959 discussion of Tongan plants, Yuncker has listed Gray's type as from Tongatapu, considering the species a Tongan endemic.

In view of the fact that no additional material of the taxon has been discovered in Tonga, whereas two other collections of it are now available from Fiji, one must assume that the Exploring Expedition material indeed came only from Fiji, and quite likely from Mbua Bay as stated by Gillespie. For the time being the taxon is best considered an infrequent Fijian endemic.

As to morphological delimitation, the three specimens cited below agree fairly well in foliage, although the leaf-blades of the Seemann collection are broader than those of the Exploring Expedition and Degener material; the two latter agree well in their fruits, but stipular differences may be noted. It is probable that the taxon as thus delimited is a sound one, but the available material is not entirely satisfactory. On the basis of what is here cited, *P. macrocalyx* is of the alliance of *P. calycosa* A. Gray, which, however, has a pedunculate inflorescence, a shorter calyx-limb, and a proportionately broader fruit. Another close relative is *P. gillespieana* A. C. Sm. (*Calycosia laxiflora* Gillespie), which differs in its large and usually crispate-pilose stipules, its comparatively long pedicels, and its larger fruits, of which the pyrenes have a characteristically broad, laterally angled, and dorsally depressed carina. The closest relative of *P. macrocalyx* is probably *P. mundula* A. C. Sm., which is known only in flowering condition; in contrast to *P. macrocalyx,* it has smaller, more congested leaves and larger stipules. The four species here mentioned —*P. calycosa* (including *P. hypargyraea* A. Gray), *P. gillespieana, P. macrocalyx,* and *P. mundula*—form a compact alliance related to *P. vitiensis* and its immediate relatives, but differing from them in the narrowly campanulate rather than fusiform to elliptic calyx-limb. The available material of *P. macrocalyx* is herewith listed.

DISTRIBUTION: Endemic to Fiji and apparently uncommon, the three known collections coming from Viti Levu and Vanua Levu at elevations of near sea level to 200 m and probably from dry forest. The only documented collection, that of Degener, was from a tree 2–3 m high; its local name was recorded as *langaingai,* and an extract of its leaves was said to be used for eye trouble.

HOLOTYPE: Fiji: Vanua Levu: Mbua: Mbua Bay, *U. S. Expl. Exped.* (US 62345 holotype; isotype at GH), collected in 1840.

OTHER COLLECTIONS: Fiji: Viti Levu: Ra: vicinity of Rewasa, near Vaileka, *Degener 15393* (A, BISH, SUVA, UC, US). Vanua Levu, without further data, *Seemann 243* (GH, K).

Psychotria pickeringii AND RELATIVES

A well-marked group of Fijian Psychotriae centering around *P. pickeringii* A. Gray has been designated as a subgenus by Gray (*Psychotria* subgen. *Piptilema* A. Gray in Proc. Am. Acad. Arts Sci. 4:46. 1860), although, as noted by Fosberg (in Sargentia 1:126. 1942), it is no more worthy of subgeneric rank than many other complexes in the genus. Treated as a species-group, it is characterized by having its flowers essentially sessile in a sessile terminal head enclosed when young by laterally connate, although not necessarily calyptrate, stipules; its calyces have comparatively short and ascending limbs. I believe that the group has been too broadly interpreted and that species with a branching inflorescence, or with clearly pedicellate flowers, are better referred to the alliance of *P. filipes* A. Gray. As thus circumscribed, the species-group is composed in Fiji of *P. pickeringii* A. Gray (including *P. solanoides* Turrill and probably *P. bullata* Seem., although these latter may represent a different specific taxon), *P. cordata* A. Gray, *P. tetragona* Seem., *P. tetragonioides* Fosberg, *P. monocarpa* Fosberg, and *P. valleculata* A. C. Sm.

In the following notes a new species of this alliance is described and the circumscription of *P. cordata* is discussed.

Psychotria kuruvolii sp. nov.

Frutex 1–1.5 m altus, ramulis subteretibus, internodiis distalibus brevibus ibi copiose pilosis (pilis rubiginosis pluricellularibus 0.1–0.3 mm longis); stipulis extra ut ramulis juvenilibus copiose pilosis intus glabris, submembranaceis, longitudine variabilibus, ad 20 mm longis et 1–2 mm latis ad apicem lateraliter connatis demum caducis, eis inflorescentiam includentibus in vagina ampulliformi 3–4 mm lata connatis, vagina mox lateraliter erupta sed in acuminem 3–7 mm longum superne attenuata; petiolis gracilibus 3–7 mm longis ut ramulis pilosis, foliorum laminis papyraceis in sicco viridi-fuscis ellipticis vel obovato-ellipticis, (3–) 4–7 cm longis, (1.3–) 1.7–2.8 cm latis, basi acutis, apice acutis vel breviter cuspidatis, supra costae basi saepe pilosa excepta glabris, subtus costa nervisque ut petiolo pilosis, costa utrinque elevata, nervis secundariis utrinsecus 8–10 patentibus supra subplanis subtus prominulis marginem versus anatomosantibus, rete venularum manifesto supra plano subtus prominulo et nervum continuum haud 0.1 mm intra marginem formante; inflorescentia terminali subcapitata 2–4-flora ubique glabra, floribus sessilibus vel petiolo haud 0.5 mm longo enatis, bracteolis inconspicuis oblongo-lanceolatis 1.5–2 mm longis obtusis fimbriolatis mox caducis; calyce sub anthesi 3.5–5 mm longo, hypanthio obconico circiter 1 mm longo basi angustato, limbo erecto cylindrico-cupuliformi submembranaceo 2.5–4 mm longo apice 2–2.5 mm diametro margine dentibus 5–8 lanceolato-aristatis 0.3–0.8 mm longis inaequaliter lobato; corolla sub anthesi 11–12 mm longa, tubo cylindrico circiter 2 mm diametro superne paullo ampliato, lobis suberectis 5 oblongis circiter 3 × 1.5 mm apice obtusis cucullatis; staminibus 5, filamentis gracilibus sub anthesi 1–2 mm longis, antheris oblongis 1.2–1.5 mm longis; disco conspicuo annulari-pulvinato ad 1.5 mm alto et 1.8 mm diametro, stylo filiformi corollam subaequante apice bifido; fructibus in vivo subglobosis ad 12 × 10 mm disco et calycis limbo persistentibus coronatis, in sicco quadrangularibus.

DISTRIBUTION: Known only from the type collection from Vanua Levu, Fiji, taken from a shrub 1–1.5 m high in secondary forest, without altitudinal notes, with small white flowers and red fruits.

HOLOTYPE: Fiji: Vanua Levu: Mbua: Mt. Seatura, *Fiji Dept. Agr.* (coll. I. T. Kuruvoli) *14896* (BISH holotype; isotype at SUVA), April 26, 1966.

The new species is most closely related to *P. pickeringii* A. Gray, which similarly has a few-flowered inflorescence of sessile flowers enclosed in bud by connate stipules. However, the flower-enclosing stipules of *P. pickeringii* usually form a subglobose or ovoid bud 5–10 mm long (rather than an ampulliform bud terminating in an obvious acumen), the flowers are often 8–10 per head, and the leaf-blades are acuminate, often conspicuously so.

Two varieties are often recognized in *P. pickeringii,* var. *pickeringii* and var. *solanoides* (Turrill) Fosberg, but it is probable that the latter should be restored to specific rank, in which case the binomial *P. bullata* Seem. may be applicable. This taxon, whether as a variety or a species, differs from the typical form of *P. pickeringii* in its more obvious (1.2–4 mm long) and evidently nerved calyx-limb and in the indument of its calyx, stipules, young vegetative parts, etc. Our new species is allied to var. *solanoides,* differing as noted above in the stipules, flower number, and foliage. The indument characteristic of var. *solanoides* is composed of crispate many-celled reddish hairs sometimes to 1 mm long.

In foliage, the new species is more suggestive of *P. monocarpa* Fosberg, known only in fruit, but that differs from *P. kuruvolii* in its glabrous habit, longer petioles, obovate leaf-blades, and very short calyx-limb.

The collector of the type material, I. T. Kuruvoli, has added much herbarium material to the growing collections of the Fiji Department of Agriculture.

Psychotria cordata A. Gray in Proc. Am. Acad. Arts Sci. 4:46. 1860; Seem. Fl. Vit. 137. 1866; Fosberg in Sargentia 1:130. 1942; J. W. Parham, Pl. Fiji Isl. 201, as var. *cordata.* 1964.

Psychotria cordata is of the evident relation-

ship of *P. pickeringii* A. Gray, agreeing in its sessile, capitate flowers initially enclosed by connate stipules forming a subglobose or ovoid bud, but differing in having its petioles longer (15–35 mm long) and its leaf-blades deeply cordate at base and terminating in a slender, caudate acumen 10–25 mm long. The species is here reviewed to account for a variety, var. *podantha* Fosberg, referred to *P. cordata* by its author. The variety has neither the leaf shape nor the sessile flowers of *P. cordata,* and its relationship is rather with *P. caldwellii* Gillespie. It appears to be a distinct taxon at specific rank, and a new combination for it is proposed below. At this time, the available material of Gray's species (for which the varietal epithet *cordata* is not required) is here summarized.

DISTRIBUTION: Endemic to Fiji, and thus far known only from Viti Levu and Vanua Levu. Although no locality was specified in the original description, the holotype bears the inscription "Muthuata, Feejee Islds.," that is, the Mathuata area of Vanua Levu visited by the U. S. Exploring Expedition. This material doubtless came from an area not too far from the coast, but the Viti Levu specimens now at hand come from elevations of 750–1090 m, occurring in forest as trees or shrubs 2–4 m high, with white corollas.

HOLOTYPE: Fiji: Vanua Levu: Mathuata: *U. S. Expl. Exped.* (US 62338 holotype; isotype at GH), collected in 1840.

OTHER COLLECTIONS: Fiji: Viti Levu: Mba: Mt. Evans Range, *Greenwood 943* (A, BISH, US), *1247* (BISH, US); Nandende Levu, Mt. Evans Range, *Fiji Dept. Agr. 14836* (BISH, SUVA); Mt. Mbatilamu, Vunda, *Fiji Dept. Agr. 14165* (BISH, SUVA).

Psychotria filipes AND RELATIVES

A group of Fijian Psychotriae of the relationship of the *P. pickeringii* group centers around *P. filipes* A. Gray; it agrees in having its stipules firmly connate into a tapering sheath and free only at brief, aristate apices, but differs in having its inflorescences obviously branched and not capitate. Immediately related to *P. filipes* are *P. pelagica* Seem. and *P. diffusiflora* A. C. Sm. Of this alliance is also *P. caldwellii* Gillespie, with more compact, fewer branched inflorescences. *Psychotria caldwellii* has often been misidentified as *P. platycocca* A. Gray, a species with similar foliage but with stipules that are free, flattened, and obviously bifid distally; the latter is closer to the group of *P. broweri* Seem. than to *P. filipes.* A very distinct taxon most closely allied to *P. caldwellii* is represented by *P. cordata* var. *podantha,* for which I herewith provide a suitable description.

Psychotria podantha (Fosberg) comb. nov.
Psychotria cordata var. *podantha* Fosberg in Sargentia 1:130. 1942; J. W. Parham, Pl. Fiji Isl. 202. 1964.

Shrub or small tree 2–5 m high, the branchlets slender, subterete, when young copiously pilose with reddish gray several- or many-celled hairs 0.2–1 mm long, soon glabrate; stipules membranous, connate into an elongate sheath 3–10 mm long and 1–2 mm broad, this copiously pilose without and glabrous within, minutely uni- or biaristate in the distal 0.5–1 mm, the stipular sheath enclosing the inflorescence somewhat larger, to 15 mm long and 3 mm in diameter, splitting along one or both sides and soon caducous; petioles slender, semiterete or shallowly canaliculate, 7–15 mm long, at first pilose like young branchlets, soon glabrate, the leaf-blades brownish green in drying, reddish-glandular on both sides, ovate-oblong, (3–) 4–5.5 cm long, (1.5–) 2–3.5 cm broad, shallowly cordate at base, obtusely cuspidate at apex into a tip 3–5 mm long, glabrous above, beneath at first pilose like the petiole on the costa but soon glabrate, the costa prominent on both sides or merely raised above, the secondary nerves 6–8 per side, spreading, nearly plane above, pale and prominulous beneath, anastomosing toward margin, the veinlets subimmersed, with a collecting nerve about 0.1 mm within the margin; inflorescence terminal, 15–25 mm long, the branches and pedicels copiously reddish-gray-pilose, usually twice branched, the branches 2–5, either spreading from base or borne at apex of a slender peduncle to 6 mm long, usually 8–12 mm long and with (1–) 3 or 4 flowers loosely aggregated near apex, the flowers sessile or on

pedicels of diverse length to 5 mm, the bracts and bracteoles membranous, oblong-linear, 1.5–3 mm long, glabrous or dorsally pilose, often sparsely fimbriolate; calyx 3.5–4 mm long, the hypanthium less than 1 mm long, the limb erect, narrowly campanulate, 2.5–3 mm long and 2–2.5 mm in apical diameter, obscurely nerved, puberulent without, glabrous within, the lobes 4–6, usually 5, oblong, 0.7–1.3 × 0.5–0.7 mm; corolla glabrous on both sides, broadly infundibular, 7–8 mm long at anthesis, about 2 mm in diameter near middle, the lobes (and stamens) 4–6, usually 5, oblong, about 2 × 1.5 mm, obtuse at apex; filaments 0.5–0.8 mm long, the anthers oblong, 1.1–1.3 mm long; disk conspicuous, glabrous, annular-pulvinate, about 1 mm long and 1.2 mm broad, the style not exserted, bifid distally; fruiting inflorescences completely glabrous, composed of a short rachis with 2–5 spreading branches, or these spreading from base and sometimes appearing axillary by further vegetative growth, the branches (5–) 10–25 mm long, bearing 1–4 subterminal fruits on slender pedicels to 5 mm long; fruits quadrangular-ellipsoid, 10–15 mm long, 7–10 mm broad, surmounted by the persistent calyx-limb, obtuse at base, the pericarp carnose; pyrenes irregularly semiellipsoid, 8.5–10 × 5.5–6.5 × 2–3 mm, obtuse at base, deeply bifid at apex into broad lobes 2–3 mm long (these sometimes again bifid and biaristate), laterally flattened to a thin margin and deeply indented (indentations rounded, 1.5–2 mm deep) near middle, ventrally smooth or slightly concave and faintly costate, dorsally sharply unicarinate near middle.

DISTRIBUTION: Endemic to Fiji and apparently rare, known only from north central Viti Levu at elevations of 750–1100 m, occurring in dense or open forest. Specimens come from shrubs or trees 2–5 m high; the only flowering collection bore white corollas in June or July, and the fruits, obtained in March, are orange.

HOLOTYPE: Fiji: Viti Levu: Mba: Nauwanga, south of Nandarivatu, alt. 750–900 m, *Degener 14831* (US 2333978 holotype; isotype at A), March 13, 1941.

OTHER COLLECTIONS: Fiji: Viti Levu: Mba: Nauwanga, south of Nandarivatu, *Degener 14827* (A, BISH, US), *14829* (A, US); western slopes of Mt. Nanggaranambuluta, east of Nandarivatu, *Smith 4821* (A, BISH, US).

The species here described is not a close relative of *P. cordata* A. Gray, but is most closely allied to *P. caldwellii* Gillespie, with which it agrees in its compact but branching (not capitate) inflorescence, its stipule type, and the general form of its pyrene. The stipules of these species are firmly connate into an elongate sheath (as in *P. pickeringii* and relatives) which sometimes encloses an inflorescence-bud but which is inconspicuously biaristate only in the distal 0.5–1 mm; each stipule thus terminates in a minute mucro rather than in a broad bilobed tip as found in many Fijian Psychotriae. The pyrenes of *P. podantha* are deeply bifid apically and laterally indented, with a single dorsal keel; those of *P. caldwellii* are basically similar but less extreme. Our species differs from *P. caldwellii* in having its leaf-blades shorter and shallowly cordate rather than attenuate at base, in the indument of its young parts (which persists for a time on the petiole and costa), and in its longer calyx-limb and corolla (these in *P. caldwellii* being 1–2 mm and 2.5–4 mm long, respectively).

The only available flowering specimen, *Smith 4821,* is similar to the three Degener collections originally cited in stipules and foliage details, differing only in the close but copious indument of its young branchlets, petioles, and costa of lower leaf-blade surfaces and inflorescence parts. As a similar indument infrequently persists here and there on the foliage of the fruiting specimens, its presence or absence in this species seems to be a factor of maturity.

Psychotria tephrosantha AND RELATIVES

One of the most abundant species of *Psychotria* in Fiji is *P. tephrosantha* A. Gray, which, with its few relatives, is characterized by a scandent habit (all other Fijian Psychotriae being trees or shrubs), small, essentially free stipules not enclosing the bud, and yellow to white (rather than red, black, etc.) fruits. Because of its abundance, *P. tephrosantha* has been more than once described, as here noted.

Psychotria tephrosantha A. Gray in Proc. Am. Acad. Arts Sci. 4:45. 1860.
Psychotria sulphurea Seem. Fl. Vit. 134. 1866.
Psychotria effusa Turrill in J. Linn. Soc. Bot. 43:26. 1915.
Psychotria setchelli Gillespie in Bishop Mus. Bull. 91:35, fig. 39. 1932.

The first two of the above synonyms are so noted by the writer in Bishop Mus. Bull. 141: 150. 1936, but *P. setchelli* had not then been considered. Gillespie's species is typified by *Setchell & Parks 15118,* from the Province of Naitasiri, Viti Levu. Although Gillespie indicates that his type specimens are deposited in the Bishop Museum, in this case the single available sheet seems to be in the herbarium of the University of California at Berkeley (no. 289-533), and this should be taken as the holotype. Its leaf-blades are proportionately narrower and somewhat thicker in texture than the average for *P. tephrosantha,* but they are by no means exceptional in that highly variable species; no floral characters seem to differentiate the two concepts.

On the basis of present evidence, *P. tephrosantha* is a Fijian endemic, but a close New Hebridean relative is *P. nacdado* Guillaumin (in J. Arnold Arb. 13:9. 1932), which may be maintained as distinct on the basis of its long, slender petioles and its reddish (rather than gray) inflorescence-indument. *Psychotria nacdado* is less closely related to the New Caledonian *P. rupicola* Schlechter, with which Guillaumin compared it.

The Fijian *P. serpens* var. *parvula* (A. Gray) Fosberg and *P. macroserpens* Fosberg, allied to *P. tephrosantha,* are readily distinguished by their usually rounded leaf-blades, compact inflorescences, and other characters. However, there does appear to be an undescribed species of this immediate alliance, herewith discussed.

Psychotria exilis sp. nov.

Frutex scandens ad 2 m altus corolla excepta ubique glaber, ramulis gracilibus teretibus vel obscure quadrangularibus; stipulis parvis interpetiolaribus semiorbiculari-deltoideis, 0.5–0.8 mm longis, 0.8–1.2 mm latis, apice rotundatis vel late obtusis, margine obscure ciliolatis; petiolis gracilibus 2–5 mm longis angulatis vel anguste alatis; foliorum laminis papyraceis in sicco griseo-olivaceis glandulosis (glandulis parvis irregularibus immersis rubiginosis), anguste lanceolatis, (3–) 4–6.5 cm longis, (0.6–) 0.8–1.2 cm latis, basi longe attenuatis et in petiolum decurrentibus, apice in acuminem gracilem obtusum 1–1.5 cm longum gradatim angustatis, margine integris et anguste recurvatis, costa utrinque elevata, nervis secundariis utrinsecus 5–8 erecto-patentibus intra marginem anastomosantibus utrinque prominulis vel planis, venulis immersis; inflorescentia terminali 2–4-plo divisa sub anthesi ad 3 cm sub fructu ad 6 cm longa, pedunculo sub anthesi 3–7 mm sub fructu ad 20 mm longo, bracteolis deltoideis haud 0.5 mm longis obtusis caducis, pedicellis gracilibus 2–3 mm longis; calyce obconico circiter 1 mm longo et apice diametro, limbo suberecto circiter 0.3 mm longo obscure 4- vel 5-denticulato; corolla infundibulari sub anthesi 5–6.5 mm longa pilis pallidis 1- vel 2-cellularibus haud 0.1 mm longis copiose minute puberula, tubo 3–3.5 mm longo intus basi excepta pilis circiter 0.5 mm longis copiose piloso, lobis 4 vel 5 oblongis 2–3 × 1 mm subacutis intus basi pilosis demum patentibus; staminibus 4 vel 5, filamentis gracilibus glabris circiter 0.5 mm longis, antheris oblongis 0.8–1 mm longis apice obtuso minute apiculatis; disco pulvinato glabro circiter 0.3 mm alto; stylo gracili sub anthesi exserto apice incrassato bifido; fructibus subglobosis ad 4.5 mm diametro basi et apice rotundatis, calycis limbo obscuro persistente incurvato et disco coronatis, pericarpio tenui subcarnoso, pyrenis semiellipsoideis circiter 4 × 3.5 × 2 mm, ventre complanatis, dorso 3-sulcatis, costis 4 rotundatis.

DISTRIBUTION: Endemic to Fiji and known only from two collections from Vanua Levu, occurring in dense forest at elevations of 300–700 m. The type material was taken from a scandent shrub 1–2 m high, in fruit in November. The other collection, in flower in March, does not bear detailed notes.

HOLOTYPE: Fiji: Vanua Levu: Thakaundrove: southwestern slope of Mt. Mbatini, alt. 300–700 m, *Smith 620* (BISH holotype; isotypes at GH, US, etc.), November 28, 1933.

OTHER MATERIAL: Fiji: Vanua Levu: Thakaundrove: Waivula, east of Savu Savu, *N. L. H. Krauss 1015* (BISH), March 22, 1966.

The type collection, in fruit, was first identified by me as a relative of, or perhaps an extreme form of, *P. tephrosantha* A. Gray. Collection of flowering material by Krauss has permitted further consideration and the conclusion that an undescribed species of this relationship is indeed represented. Differences between the two species may be indicated by the following key:

Stipules deltoid-subulate, 1.5–3 × 1–1.5 mm, narrowed to a sharp acumen 0.5–1 mm long; inflorescence-branches, pedicels, and calyx copiously but minutely puberulent at anthesis, the indument (except on calyx) persisting in fruit; indument of inner surface of corolla-tube not extending to lobes; leaves with petioles (5–) 8–40 mm long and blades (2–) 2.5–4 times as long as broad, (5–) 7–15 × (1–) 2–6 cm .... *P. tephrosantha*

Stipules semiorbicular-deltoid, to 0.8 × 1.2 mm, rounded or broadly obtuse at apex; inflorescence-branches, pedicels, and calyx glabrous even in young inflorescence; indument present on corolla-lobes as well as inner surface of tube; leaves with petioles 2–5 mm long and with narrowly lanceolate blades, these 4–7 times as long as broad, (3–)4–6.5 × (0.6–)0.8–1.2 cm ..... *P. exilis*

The new species has also been thought suggestive of *P. gracilis* A. Gray; that species, typified by a specimen from Vanua Levu without habitat notes, seems anomalous among Fijian Psychotriae. It may be closer to the group of *P. tephrosantha* than to any other readily recognized species-group, but in view of past misunderstandings of Gray's type material a redescription and evaluation are herewith presented.

Psychotria gracilis A. Gray in Proc. Am. Acad. Arts Sci. 4:45. 1860; Seem. Fl. Vit. 136. 1866; J. W. Parham, Pl. Fiji Isl. 204. 1964.

Habit unknown (whether tree, shrub, or liana), glabrous throughout except inflorescence, the branchlets subterete, very slender; stipules interpetiolar, 2–2.5 mm long, laterally connate to form a short sheath, this 0.5–0.8 mm high, each stipule biaristate, the tips lanceolate-subulate, 1.3–1.8 mm long, lateral to and slightly within the petiole; petioles slender, 3–8 mm long, the leaf-blades papyraceous, lanceolate, 5–7 cm long, 0.8–1.2 cm broad, attenuate at base and long-decurrent on the petiole, gradually acuminate at apex (acumen slender, 1–1.5 cm long), entire and narrowly recurved at margin, the costa sharply elevated on both sides, the secondary nerves 10–14 per side, interspersed with others nearly as evident, short, spreading, curved, anastomosing just within the margin, plane and inconspicuous above, prominulous beneath, the veinlets subimmersed; inflorescence terminal, compact, 1.5–2.5 cm long, 3- or 4-times branched, pedunculate, the peduncle 9–11 mm long, the indument of peduncle, branches, pedicels, and external floral parts composed of minute cinereous unicellular spreading hairs scarcely 0.02 mm long, the bracts and bracteoles lanceolate, 0.5–0.8 mm long, caducous, the pedicels at anthesis about 1 mm long; calyx about 1.2 mm long, the hypanthium narrowly cupuliform, the limb suberect, about 0.5 mm long, the lobes 4, about 0.3 mm long, deltoid, subacute; corolla infundibuliform, about 6 mm long at anthesis, the tube slender, 3.5–4 mm long, the lobes 4, oblong, subspreading, 2–2.5 × 1–1.5 mm, obtuse, obscurely papillose-puberulent or glabrous within; stamens 4, affixed in corolla-throat, the filaments slender, glabrous, about 2 mm long, the anthers slenderly oblong, about 1.5 mm long, dorsifixed at about the middle; style not observed (the single mature flower not dissected).

HOLOTYPE: Fiji: Vanua Levu: Mathuata: *U. S. Expl. Exped.* (US 58426 holotype; isotype at GH).

As Gray's and Seemann's descriptions of this apparently rare species are too brief to be informative, the above is supplied. Since no other collections agreeing with the type have been located, the possibility of a mislabeling was contemplated; however, no Samoan or Tongan material seems to be of this relationship, and one must assume that the locality data are correct. The species is without close relatives in Fiji; perhaps in general it is allied to *P. tephrosantha* and *P. exilis,* discussed above, but it differs from them in having its stipules biaristate (rather than semiorbicular to deltoid-subulate) and its leaf-blades with comparatively numerous, short secondary nerves.